Harvest Green Power

Opportunities for Economic Development

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Windustry Partners

- MN SEED (Sustainable Energy for Economic Development)
- High Plains SEED (ND, SD,WI, IA,NE,KS)
- American Corn Growers Foundation/Association

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Windustry
Institute for Ag & Trade Policy

- newsletter
- www.Windustry.org
- provide information and technical assistance for wind energy development
- online tools for evaluating distributed project feasibility
- Wind Farmers Network

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Long-term Benefit Energizing Agriculture

- Exploring incentives or financing mechanisms in the new Farm Bill
- Inviting Rural Electric Coops into discussions for new energy crops
- Encourage local ownership and local use of ag-based energy

Possible Farm Bill Incentives

Renewable Energy Production Incentive (REPI)

- Guarantee full 10-year funding for all applications
- Expand for other tax-exempt entities
- Double the payment for for projects in economically depressed rural counties or USDA empowerment zones
- Broaden to encourage greater production from biomass

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Possible Farm Bill Incentives

Production Tax Credit (PTC) -

- Extend 10 years
- Double the credit for on-farm applications, for majority ownership local to project and for projects in economically depressed rural counties
- Broaden to encourage greater production from biomass
- Allow credits to be transferred so majority ownership by large taxable entity is not required

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Possible Farm Bill Incentives

- **Rural Utility Service (RUS) -** Full funding for renewables loans and loan guarantees. Additional funds should be appropriated based on demand.
- **Rural utility line upgrade funds** for interconnecting renewables. - Used to offset line upgrades, increase reliability and strengthen rural grids.
- **National Rural Renewable Portfolio Standard** (NRRPS) - generation from farm-based wind, solar, biomass (excluding non-organic solid waste incineration), and low-impact hydropower should equal 5% by 2005 and 10% by 2010.

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Significant Observations

- Areas of good wind resources coincide with economically deprived regions
- Technological Issue of Limited Transmission
- Average age in rural America is 58 years

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Significant Observations

- Historically Limited Access to Capital
- Farmers/Ranchers need new long-term revenue stream

Agriculture & Energy

- Wind Power
- Ethanol and other biofuels
- Methane Digesters

Project Characteristics

- Distributed Generation
- Clean, Renewable
- Farmer or Rural Community Owned
- Power or biofuel is used locally
- Environmental benefits
- Green Attributes

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Markets

Policy

- Mandates
- Emissions reduction goals
- Portfolio Standards

Consumer

- Green Pricing

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Harvest the Wind

- Lease Land to a wind developer
- Form an ownership entity for commercial-size project
- Install a wind turbine on your land to produce your own electricity (small size turbine)

Wind Easements

- No standards
  - Some good, some bad, some ugly
- Long Term
  - Range from 20 years to perpetuity
  - Most common 25-40 years
- Main benefit
  - A way to participate in wind development with no cash outlay from landowner

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Farmers/Landowners Consider Your Options

- Organize with other landowners and collectively negotiate for the broad area
- Partner with a wind developer
- Own and operate your own wind turbine
- Form a value-added wind business
- Partner with the electric coop or municipal utility in your region

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Farmer-Owned Large Scale Wind Projects

- Kas Brothers
- Ed Olsen
- MN Wind I and MN Wind II
- Montana Irrigation project

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Kas Brothers Plant 25-Year Cash Crop

- First farmer owned commercial-scale project in Midwest/US.
- Two 750 kW Micon turbines to be installed in summer of 2001.
- Financing done with local banks.
- Power will be purchased by Xcel Energy

Richard and Roger Kas --Woodstock, Minnesota

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Power Purchase Agreements - for Wind

- Proprietary/Confidential
- Have to be negotiated
- "Standard tariffs" for small projects would be a boon for both suppliers and power providers (under 5 or 10 MW)

Power Purchase Agreement - Small Wind

- Utility talks of 3.3¢/kWh in this good wind area
- State producer payment (in MN) for projects under 2MW, 1.5¢/kWh
- Federal production payment, 1.7¢/kWh

Community-Owned Large Scale Wind Projects

- Municipal Utilities - Moorhead, MN
- School districts - Spirit Lake, IA
- Tribal Communities - Rosebud in SD and Blackfeet in WY

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Long-term Benefit from Wind Development

- Ongoing work to explore innovative business models for farmers to have ownership
  - Coops
  - Sale/Leaseback
  - LLC
  - Turnkey Equipment Manufacturer agreements

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Biomass is BIG

Many different crops or sources

- Some grown for processing
  - Corn, grasses, hemp, trees
- Some biowaste from other processes
  - Cheese whey, rice straw
- Some oils from plants, biodiesel
  - Soy, hemp
- Some municipal solid waste
  - Trash

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MN Ethanol Program

Components:

- 1. Oxygenated fuel statute that requires statewide oxy-fuel (ethanol) use,
- 2. The ethanol producer incentive provides payment for ethanol produced,
- 3. $550 million in total corn/ethanol plant project spending for construction and startup costs.
  - * $370 million in private sector financing was contingent on local equity capitol.
  - * $180 million local equity capitol raised by over 8,000 farmers and local businesses.
- 4. $240 million worth of corn is committed for processing annually by local farmers.

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MN Ethanol Program

Results as of 12/2000:

- 1. 130 million bushels of corn (17% of Minnesota crop) is made into ethanol and other products.
- 2. Minnesota's 14 plants can produce over 220 million gallons of ethanol per year.
- 3. Twelve of Minnesota's 14 ethanol plants are NGCs**.
- 4. Nearly 10% of our gasoline is being replaced by ethanol each year.
- 5. The Twin Cities Area met EPA's carbon monoxide standard and has recently achieved "attainment" status. The continued use of ethanol is required to keep emissions low.

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MN Ethanol Program

Goals:

- 1. To build a new market for the state's largest crop (corn).
- 2. To develop corn processing/ethanol production facilities in Minnesota.
- 3. To increase the number of New Generation Farmer Coops (NGC).
- 4. To replace 10% of imported petroleum we use for gasoline. ($100 million annual savings)
- 5. To help the Twin City Area meet U.S. EPA standards for carbon monoxide.

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Current Value-added

- Processing feedstock products (i.e. corn) instead of exporting raw feedstock more than doubles the value of each bushel.
- In addition to fuel ethanol, corn plants produce 1,000,000 tons of high protein livestock feed plus other products including: industrial ethanol, starch, sweeteners and carbon dioxide.
- **New Generation Farmer Co-ops (NGC) may be combined with or converted to limited liability companies or partnerships that are generally designed to:
  - 1. be built by farmers to process member crops,
  - 2. return more cash to farmers than conventional markets would provide,
  - 3. be controlled by farmer board members so that farmer profits remains a top priority,
  - 4. create a stable source of local jobs and economic development.

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Converting the energy contained in cow manure into energy

- Methane-Biomass Recovery system

Haubenschild Farm

Producing many deliverables in an evironmentally safe manner

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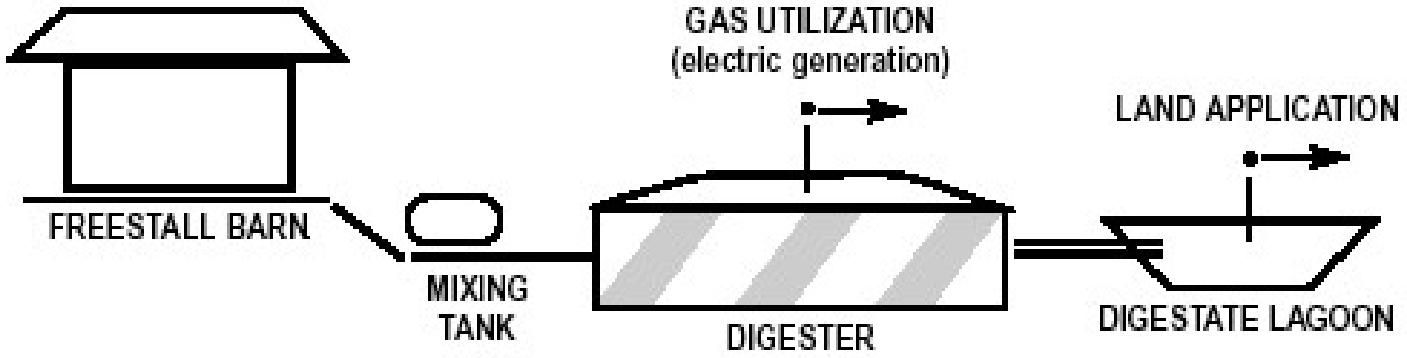
Benefits of An Anaerobic Digester



- Odor Control
- Pathogen Reduction
- GHG Reduction
- Increased value of manure as fertilizer
- Generation of Electricity
- Thermal Energy Production
- Sale of digested fibers

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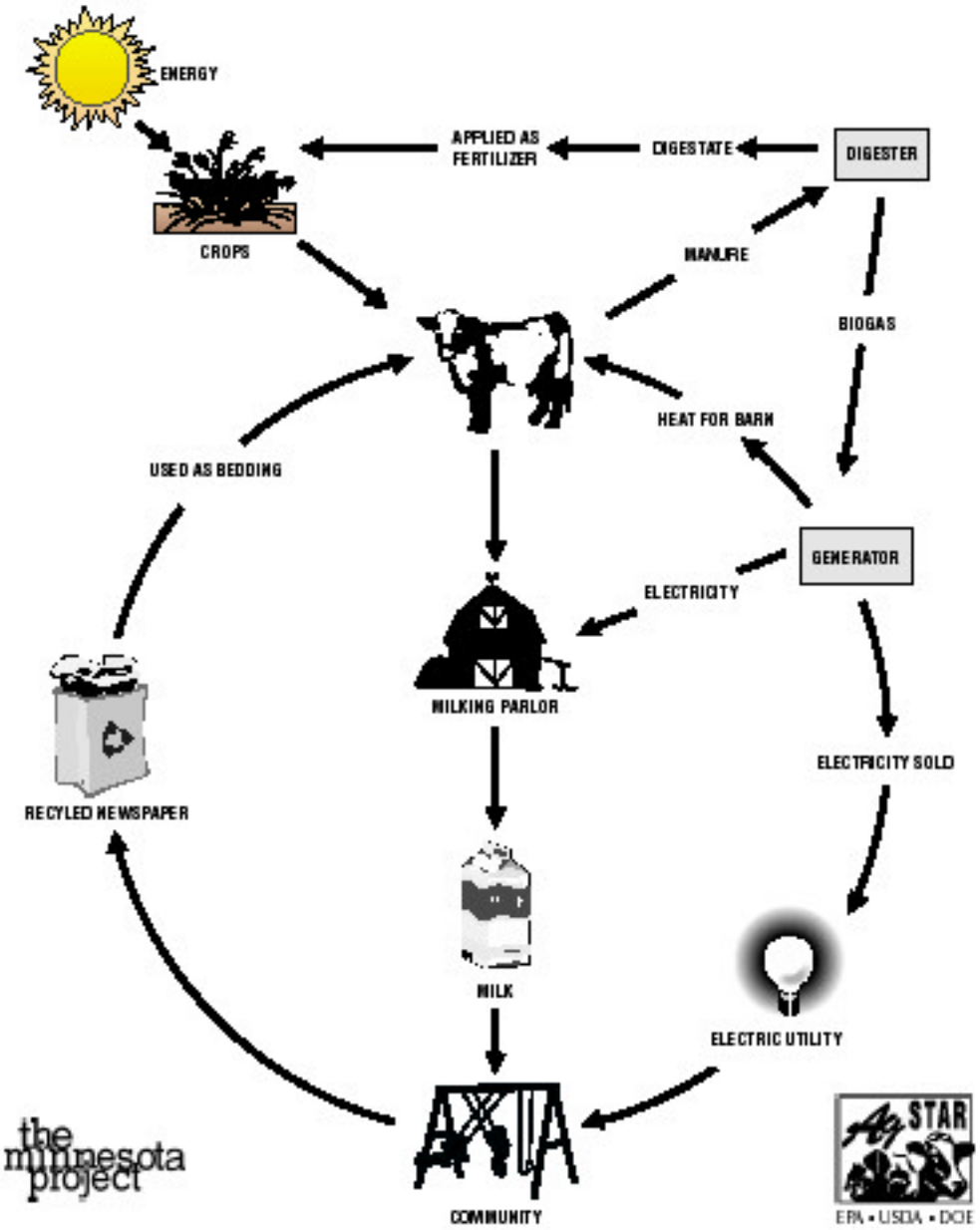
Reducing Environmental Impacts:
Closing the Loop and Connecting to the Community

April, 2000



the minnesota project

AgSTAR
EPA • USDA • DOE

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Electricity From Methane

- Local REC - East Central Energy
- Power Purchase contract 7.25¢/kWh
- 5- Yr contract and 5-Yr payback
- Currently approx. 100,000 kWh/mo.
- 40% on farm use
- 60% sold to East Central

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East Central Energy (REC)

Henry Fischer, Business Dev. Manager

"We believe the Haubenschilds digester is an outstanding example of sustainable agriculture. "

- System Reliability 98.7%
- Yes, this is replicable
- Currently working on 2 more local projects

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Current electricity output

Marty Kramer, Bus. Devel. Rep.

- Ave. Cow will produce:
  - .33¢ of milk/day
  - .40¢ of electricity/day
- Monthly excess electricity approx.
  - 78 homes or
  - 1 Big McDonalds with a Playland

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How to View Ag-based Energy

- As a significant new commodity
  - compared with corn, soybeans, wheat or ranching
- As a new clean energy resource
  - compared with oil and gas
- A new industry for rural economy
  - adds diversity of natural resource-based industries for rural US

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Challenges for Ag Energy

- Access to capital
- Access to the Grid
- Access to Markets
- Access to Information
- Public Policy
- Grassroots Support

In Conclusion

- Consider the ratio
  Risk vs Reward

- Although there are sizable challenges for developing new energy - the potential payoffs are enormous not only for the rural economy but also for the environment.

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In Conclusion

Windustry believes:

- When energy providers are ready
- When the market is ready
- Farmers and rural communities will be ready to supply Green Power

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